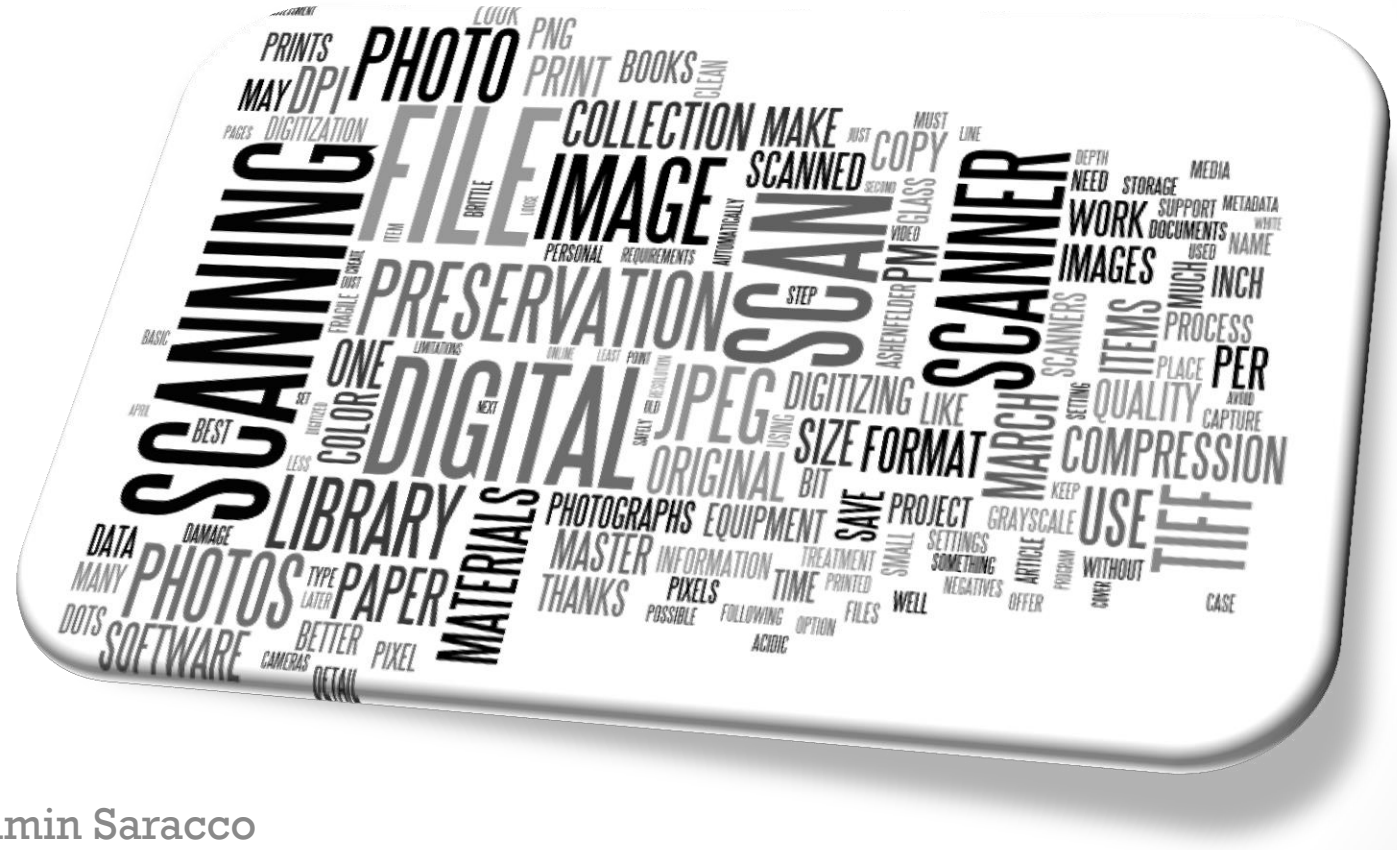
Introduction to Preserving Digital Images & Scanning



Benjamin Saracco
NJ Reference & Digital Projects Librarian
NJ State Library
609-278-2640 Ext:115
bsaracco@njstatelib.org

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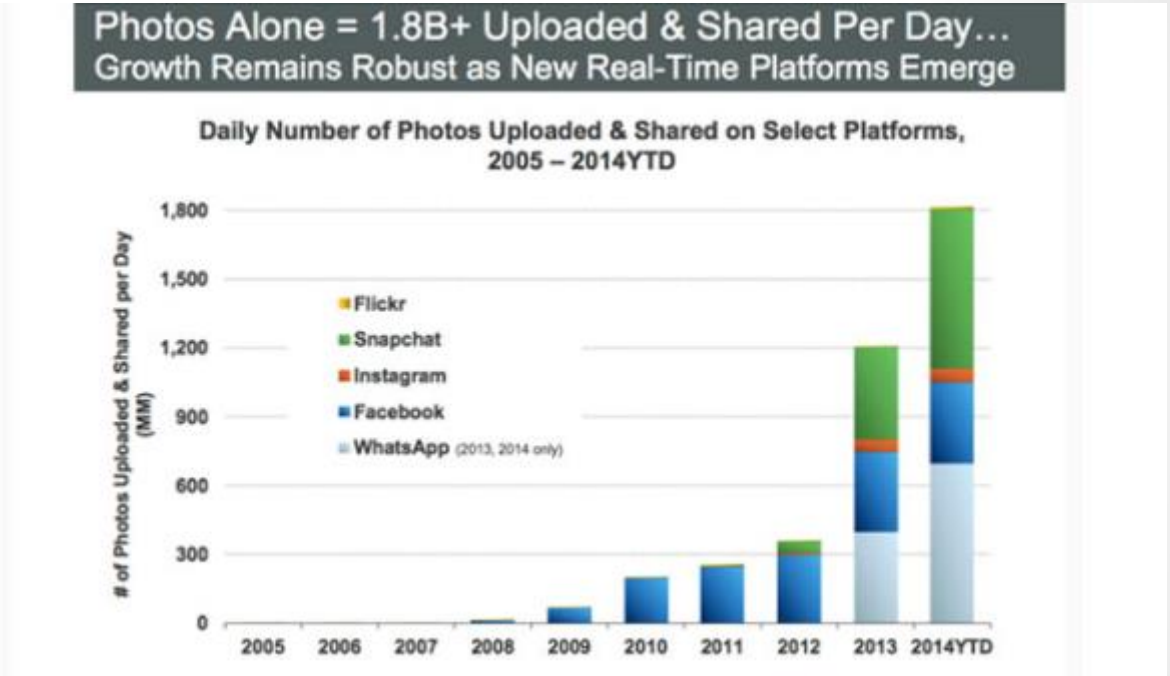
Photo Over-load…

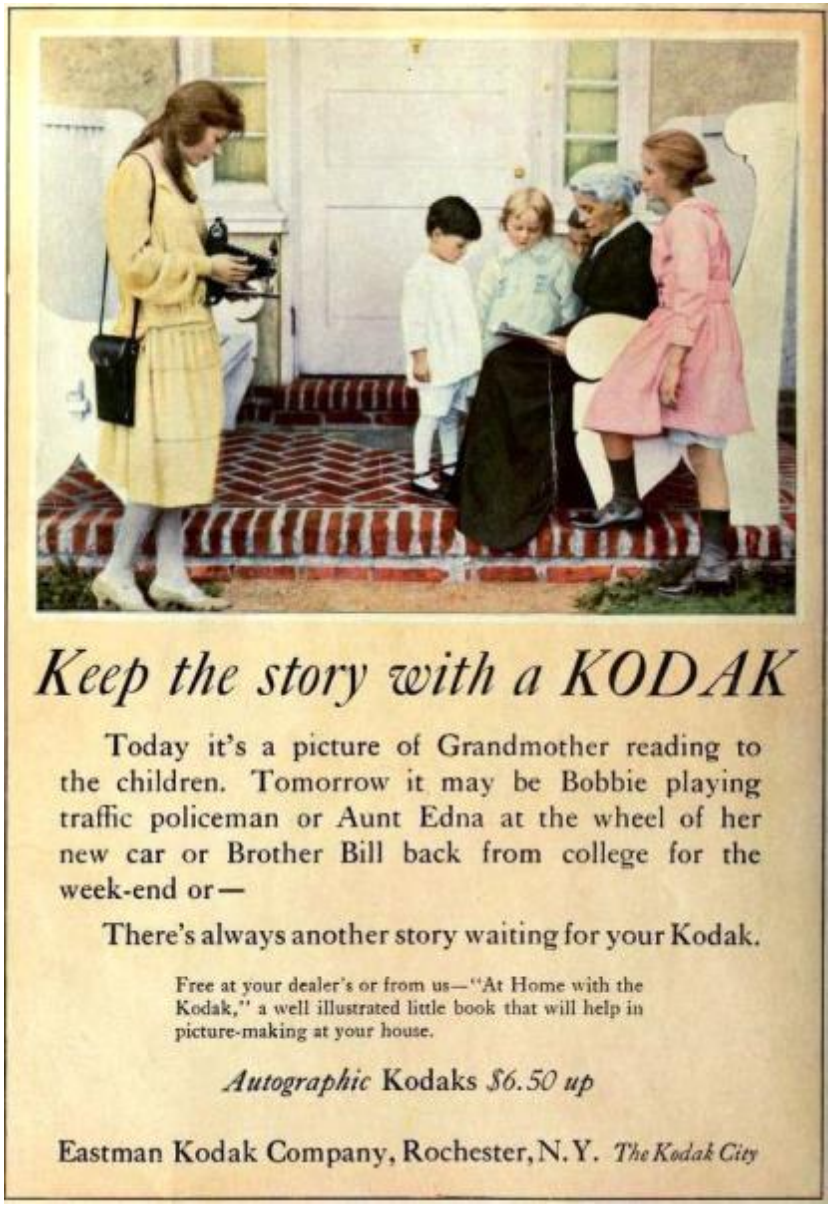
- Over two billion digital photos are uploaded to the Internet every day.
- How many of these images will be preserved for the future?



Source: KPCB estimates based on publicly disclosed company data, 2014 YTD data per latest as of 5/14/2014

So how did we get to this point?

Amateur Photography's Beginnings



- In 1888 the Kodak #1 camera was introduced to the market.
- The camera came with a 100-exposure roll of film. The entire camera was sent back to Kodak for processing when the time came and it was shipped back to the owner with a fresh roll of film.
- The compilers of family albums often arranged the photographs in narrative sequences, providing factual captions along with witty commentary; some albums contain artfully elaborate collages of cut-and-pasted photographs and text, often combining personal snapshots with commercial images clipped from magazines as well.

Text box credit: Fineman, Mia. "Kodak and the Rise of Amateur Photography". In *Heilbrunn Timeline of Art History*. New York: The Metropolitan Museum of Art, 2000–. http://www.metmuseum.org/toah/hd/kodk/hd_kodk.htm (October 2004)

Photo Credit: "Kodak May 1922" by The Bees Knees Daily is licensed under CC BY 2.0

Amateur Photography's Beginnings

- The camera very quickly became a huge success with amateur photography clubs popping up across the country and the an entire new lexicon based around the word Kodak, (can you see any comparisons in contemporary times with products such as the iPhone or iPad).

- The great majority of early snapshots were made for personal reasons: to commemorate important events (weddings, graduations, parades); to document travels and seaside holidays ; to record parties, picnics, or simple family get-togethers; to capture the appearance of children, pets, cars, and houses.

Text box credit: Fineman, Mia. "Kodak and the Rise of Amateur Photography". In *Heilbrunn Timeline of Art History*. New York: The Metropolitan Museum of Art, 2000–. http://www.metmuseum.org/toah/hd/kodk/hd_kodk.htm (October 2004)

Original Kodak #1 Camera

Photo Credit: By Bronger (Own work) [CC0], via Wikimedia Commons

Then vs Now….Vacations

Early Kodak Photo

"Unknown Artist, American School: [Woman and Dog on Beach, Far Rockaway, New York]" (2000.298.3) In *Heilbrunn Timeline of Art History* . New York: The Metropolitan Museum of Art, 2000–. (October 2006)

Online Photo of today

Photo Credit: "Banana Island" Roslyn is licensed under CC BY 2.0

Then vs Now…. Children & Family

Early Kodak Photo

Photo Credit: "Two young girls" National Media Museum is licensed under CC BY 2.0

Online Photo of today

Photo Credit: "The Mommy and Me Tea" USAG-Humphreys is licensed under CC BY 2.0

Then vs Now…. Selfies!

Early Kodak Photo

Photo Credit: State Archives of Florida, Florida Memory, https://floridamemory.com/items/show/129743

Online Photo of today

Photo Credit: "The Mommy and Me Tea" **USAG-Humphreys** is licensed under CC BY 2.0

Digitally Preserving Printed Photos & Film

- Analog to digital conversion
  - When a physical image or piece of film is digitized the newly created digital image file has several characteristics which help describe it's size and color.
    - Resolution: DPI or PPI
    - Image size: Pixels
    - Bit depth
    - Compression
    - File formats

Resolution: DPI and PPI

- **PPI or "Pixels Per Inch":** Refers to digital devices, typically computer monitors and screens, smartphone screens, image scanners, digital cameras, etc. PPI is the number of square pixels per inch in you image. PPI affects the size of the photo and the quality of printing.

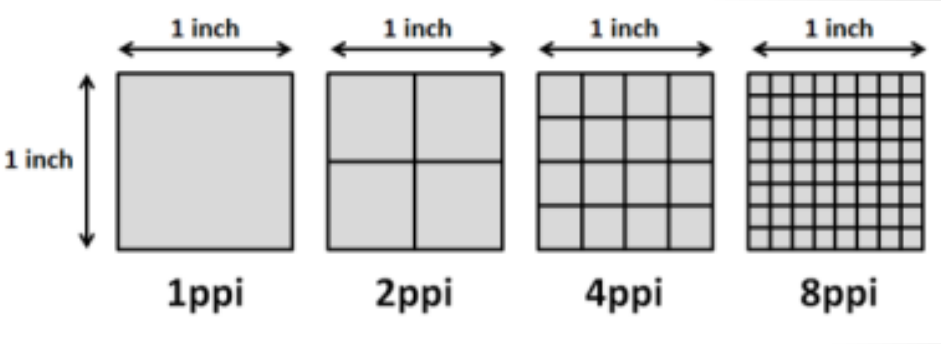


Image source: Pixel Density: Pixels Per Inch (PPI) Explained. (2013, July 16). Retrieved September 28, 2015.

- If there are too few pixels per inch, then the pixels will be "larger" creating a more jagged edged look. The more pixels per inch the "smaller" the pixel will be and the sharper and better the image will look.
- Definition from: **Puma Prints. (n.d.). Retrieved September 28, 2015.**

Resolution: DPI and PPI

- **DPI or "Dots Per Inch“ &“Pixels Per Inch”:** Refers to printing and is the number of individual dots that are printed within the span of 1 inch. A printer with a maximum DPI of 720 can print up to 720 dots of ink every inch. A printer with a maximum DPI of 1200 can print up to 1200 dots of ink every inch. By just picturing this you can see how the final print quality is affected. A photo printed at 300dpi versus one printed at 72dpi will be much sharper, smoother, have better color, and an overall better picture. Images printed at a low resolution will look fuzzy and have poor quality. The higher the DPI the better. The printer can only print the resolution of the printed image. If the image is 72ppi the maximum DPI the printer can print that image at is 72dpi. A 72ppi image can't be printed at 300dpi.

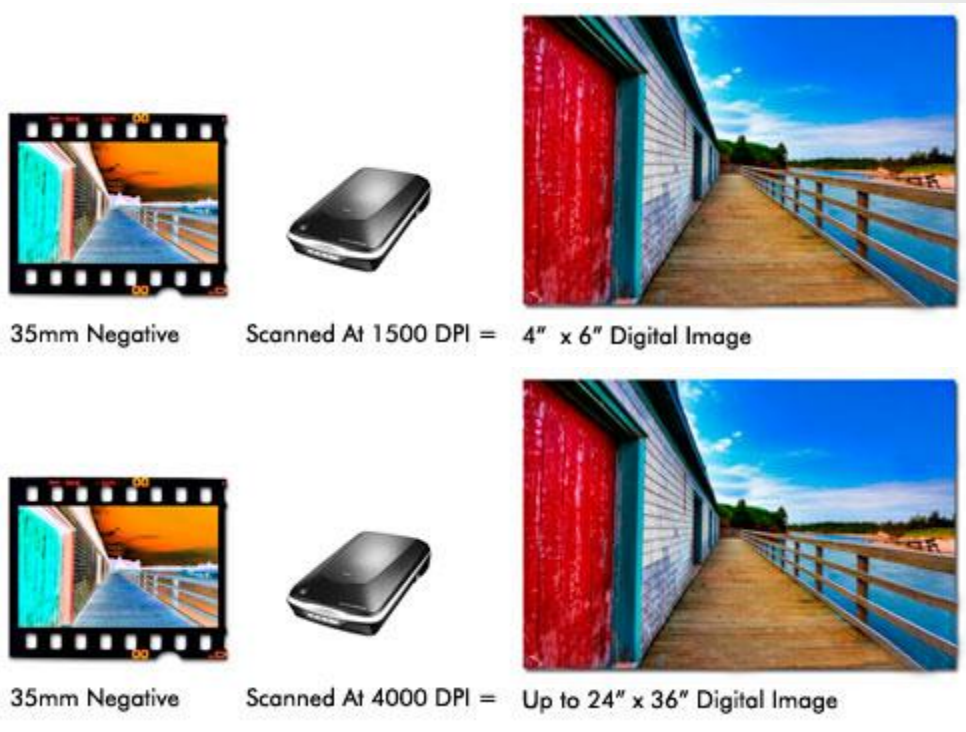
- Definition and photo from: **Puma Prints. (n.d.). Retrieved September 28, 2015.**

Totally confused…?

- Don't worry, it really isn't that important. To make things worse many companies and websites incorrectly use the two terms interchangeably.

Follow these simple guidelines when scanning prints and film and you should be fine!

1. For scanning printed photos with a flatbed scanner, scan at a minimum of 300PPI.
2. When scanning 35mm film with a compatible flatbed scanner or film scanner scan at a minimum of 1500PPI. This will produce a 4" by 6" digital image.



Best Resolution: When Scanning Different Negative Format Types. (n.d.). Retrieved September 28, 2015.

Bit Depth Explained

- **BIT DEPTH** is determined by the number of bits used to define each pixel. The greater the bit depth, the greater the number of tones (grayscale or color) that can be represented. Digital images may be produced in black and white (bitonal), grayscale, or color.

- Example: In a 2-bit image, there are four possible combinations: 00, 01, 10, and 11. If "00" represents black, and "11" represents white, then "01" equals dark gray and "10" equals light gray. The bit depth is two, but the number of tones that can be represented is 4. At 8 bits, 256 (2 8) different tones can be assigned to each pixel.

- Definition and example from: Digital Imaging Tutorial - Basic Terminology. (n.d.). Retrieved September 28, 2015, from https://www.library.cornell.edu/preservation/tutorial/intro/intro-04.html

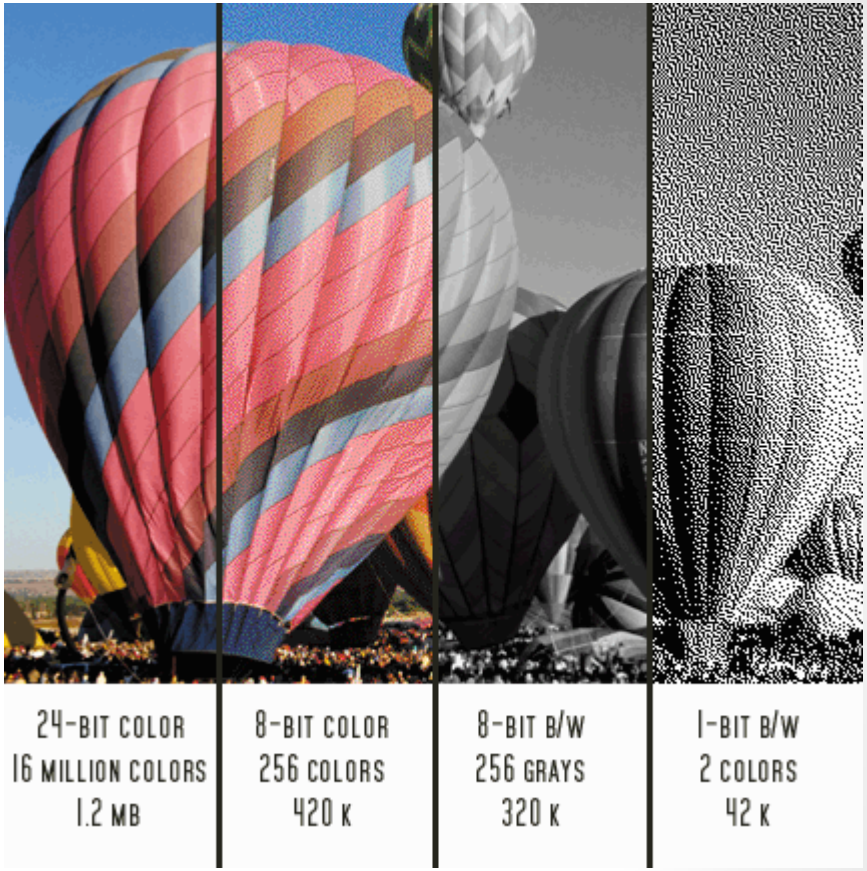


Image source: Bit Depth - Color Palettes - Dithering. (n.d.). Retrieved September 28, 2015, from http://www.ou.edu/class/digitalmedia/articles/ColorPalette

STILL CONFUSED ABOUT BITS?

- Don't worry, follow these tips when scanning and you will be fine!

The most commonly used scan settings are:

- 8-bits per pixel grayscale for (black and white prints and film scanning)
- 24-bits-per-pixel color (48 bit if possible for color prints and film scanning)

File Formats & Compression

Lossless Image File Formats

- TIFF: Most widely used image format for preserving high quality images in digital archives. (Largest file size). Best option for those lot's of storage space.
- PNG: Similar to TIFF but less compatible with different types of software. Avoid this format for long term storage. Good for creating smaller images or web design.
- RAW: This is a relatively newer image format that is created by higher-end digital cameras. This format is good for photos that will be re-edited one day with a program such as Photoshop. I would avoid this format for long term storage however for edited images.

Images Formats with Compression

- JPEG (high quality setting): This is the most widely used and popular image format for digital images. It uses very good compression that results in very little loss of image quality when saved using the high quality setting. Each time the file is edited and resaved it losses quality!
- BPG: Same quality as JPEG but at half of the file size. The catch is that this file format is proprietary and not widely used yet. It should be avoided altogether for now…
- GIF: While Gifs are technically lossless, they can only use 256 colors! Gifs are best used for web graphics with limited colors or for creating animated images. Avoid this format for long term storage.

File Size Comparison

Comparison of image sizes using different file formats

- Tiff, uncompressed 901K
- JPG, High quality 319K
- JPG, medium quality 188K
- JPG, moderate web quality 105K
- JPG, low quality / high compression 50K
- JPG, absurdly high compression 18K
- PNG, lossless compression 741K
- GIF, lossless compression, but only 256 colors 131K

File Types and Compression. (n.d.). Retrieved September 19, 2015, from http://www.gifted.uconn.edu/siegle/HonorsSeminar/filetype.html

So what file format is best for me?

I am a….

Smartphone photographer, someone with limited funds or means to pay for storage costs:

JPEG High Quality

Professional photographer, Historian or someone saving extremely valuable or precious images:

Popular Image Editing Programs

In order to change file formats, resize, crop and edit your images you will need some type of image editing software…

Popular Image Editing Programs: FREE options

GIMP: Available for PCs, Macs and Linux

Popular Image Editing Programs: FREE options

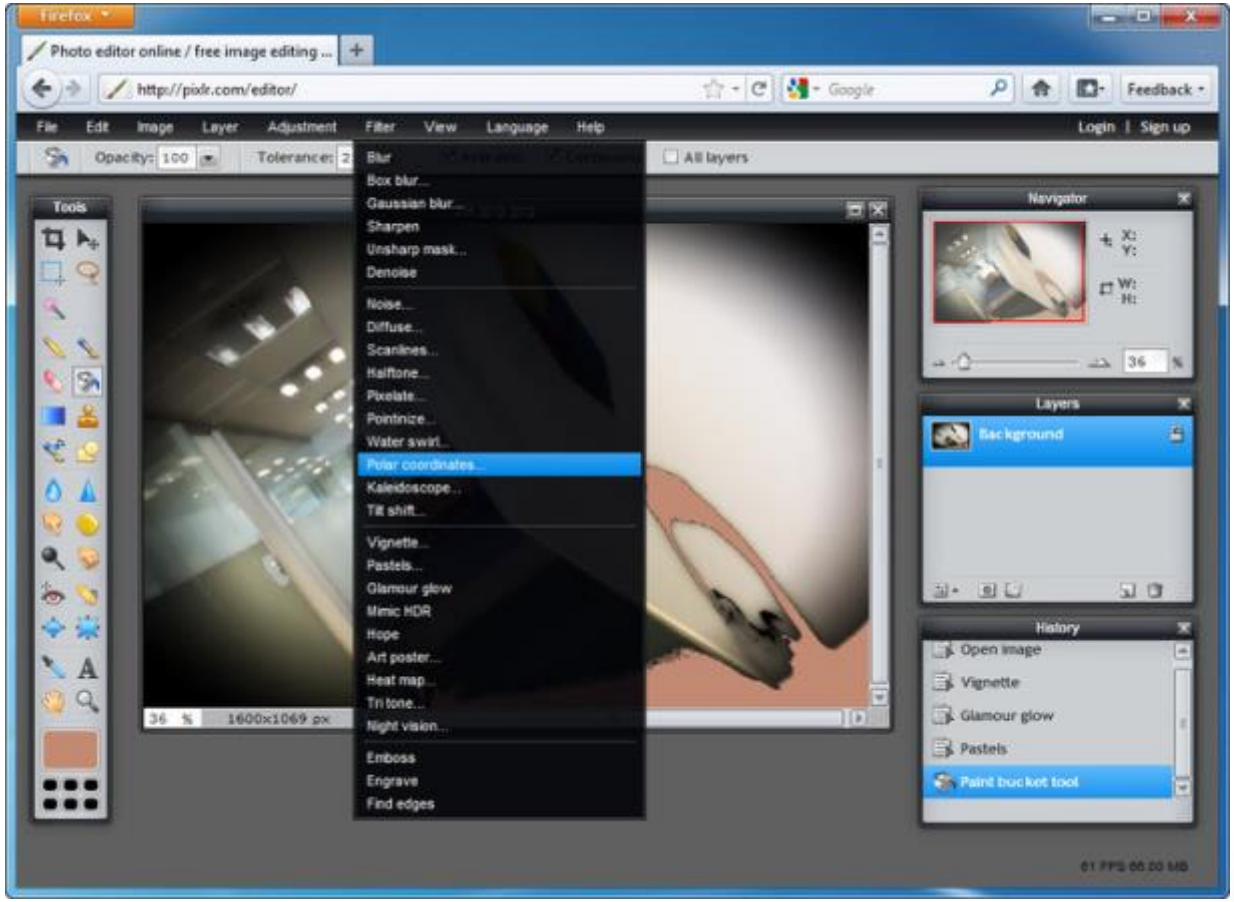
GIMP: Available for PCs, Macs and Linux

Pros/ Strengths	Cons/Limitations
• Free and Open-source • Is extremely advanced software with many possible functions, tools and plug ins • Works on many different operating systems	• One of the more difficult software for beginners • Can be buggy compared to similar paid options • Not as many tutorials available as paid options

Best for: The veteran image editor on a budget.

Popular Image Editing Programs: FREE options

Pixlr Online Editor: Available on almost any computer with internet



Popular Image Editing Programs: FREE options

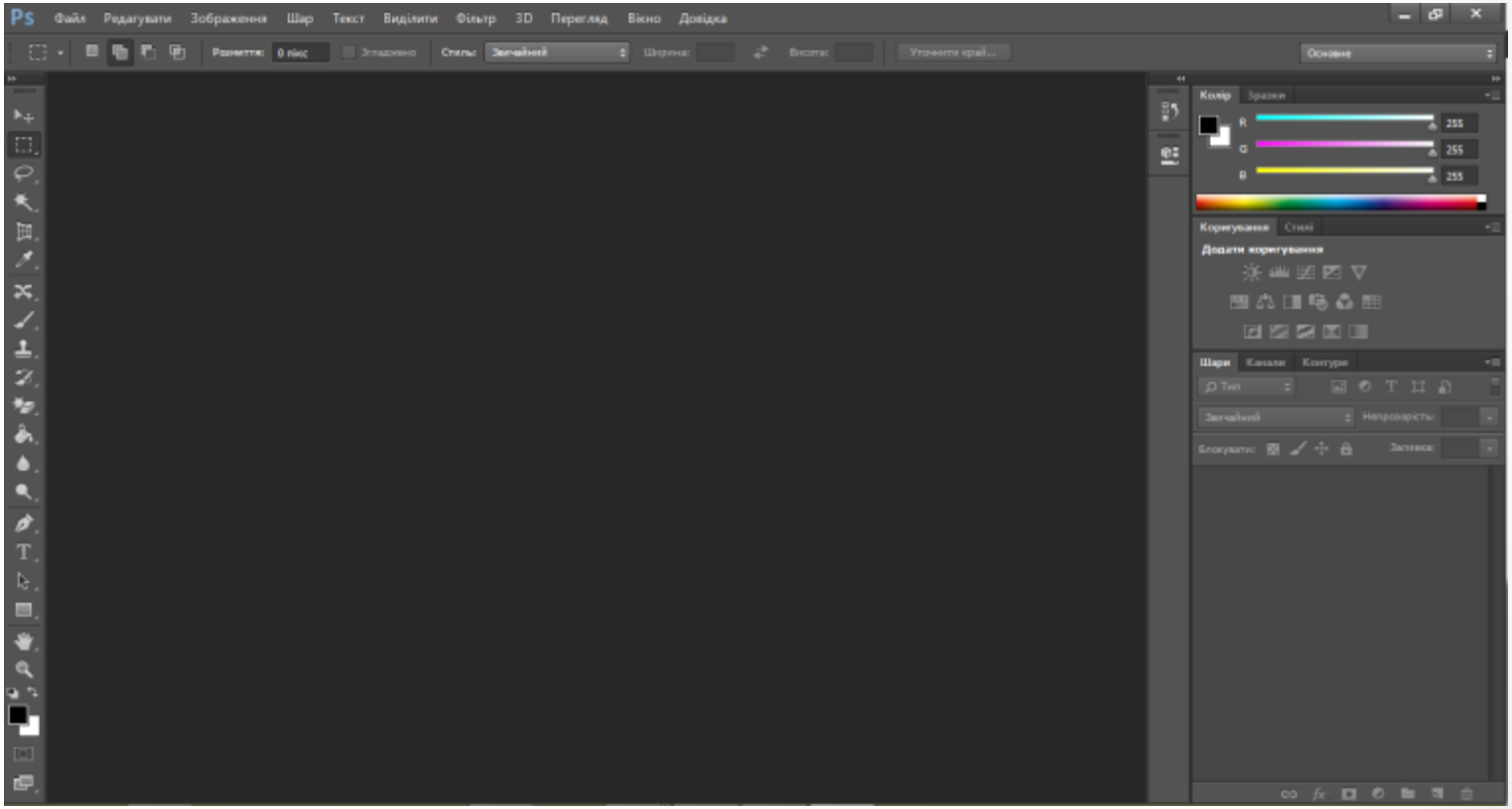
Pixlr Online Editor: Available almost any computer with internet

Pros/ Strengths	Cons/Limitations
• Web based application which means you can access it from a web browser. • Is easy to work with and use. • Fast to use.	• Not good for editing multiple images. • Need internet to use. • Not as many editing options as some other software.

Best for: The beginning photo editor who wants to try something out with no effort.

Popular Image Editing Programs: PAID options

Adobe Photoshop CC: Available for Mac and PC



Popular Image Editing Programs: PAID options

Adobe Photoshop CC: Available for Mac and PC

Pros/ Strengths	Cons/Limitations
• Most robust image editing software available. • Supports RAW image file formats created by modern digital cameras.	• Really expensive. • Need a relatively powerful computer to run it effectively. • High learning curve.

Best for: The professional graphic designer, photographer or photo enthusiast

Popular Image Editing Programs: Mac-only options

OSX Photos App: Mac only (Comes with OS X 10.10.3 Yosemite)

Popular Image Editing Programs: Mac-only option

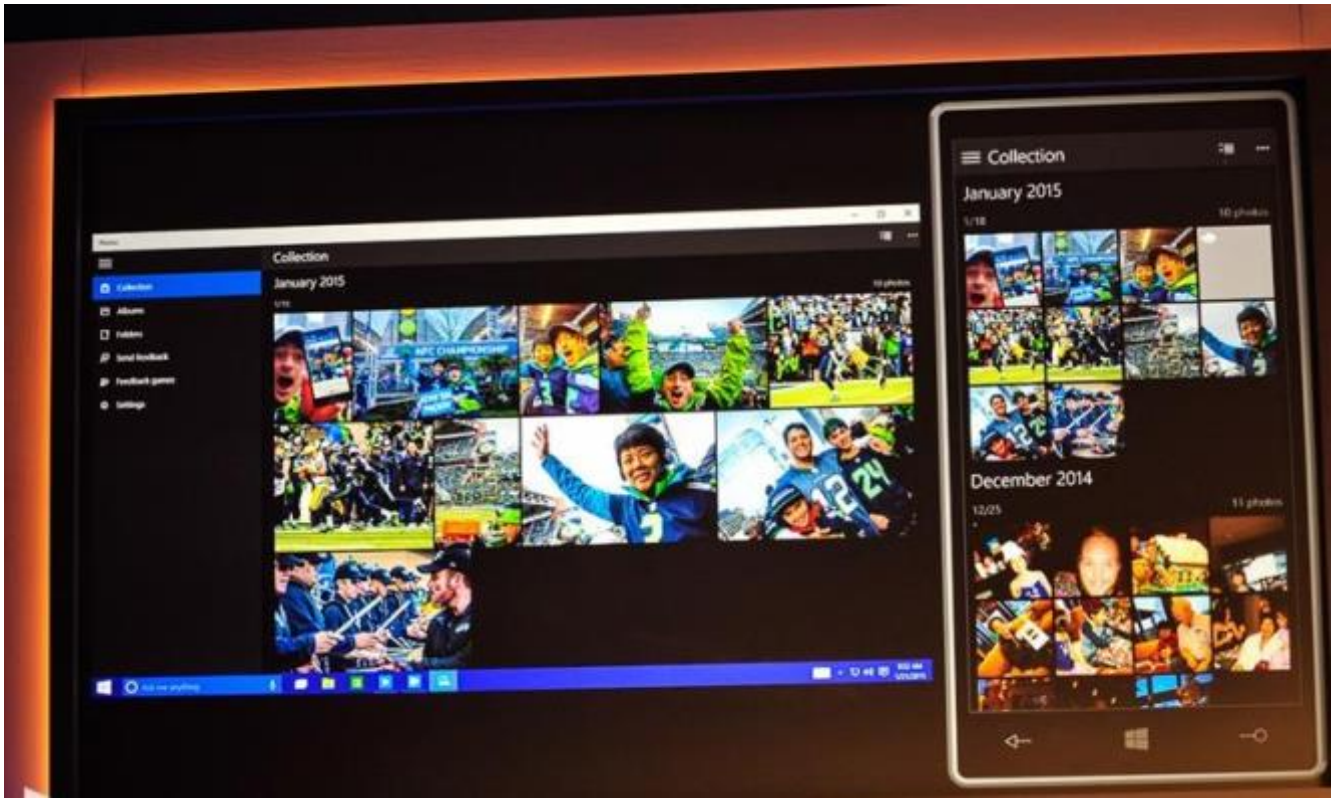
OSX Photos App: Mac only (Comes with OS X 10.10.3 Yosemite)

Pros/ Strengths	Cons/Limitations
• Very nice, easy to use interface. • Serves not only as an image editor but also an image library and backup solution (more on that later).	• You must have a newer Mac to use it. • Does not many editing features as the Aperture software it replaced. • Only available for Osx Yosemite and later.

Best for: The mac-lover

Popular Image Editing Programs: Windows-only options

Windows Photos App: Windows only (Comes with Windows 8 & 10)



Popular Image Editing Programs: Windows-only options

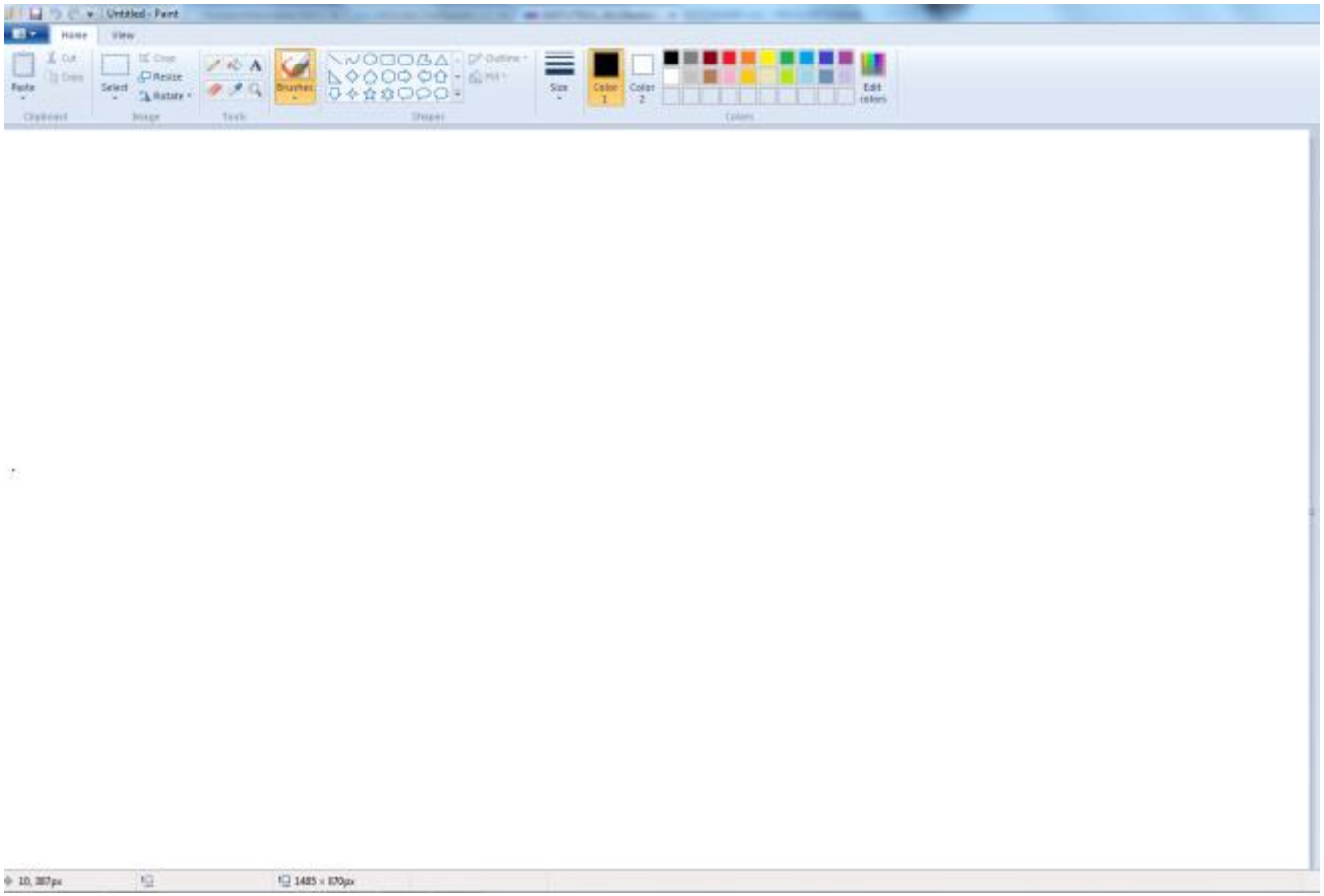
Windows Photos App: Windows only (Comes with Windows 8 & 10)

Pros/ Strengths	Cons/Limitations
• Easy to use interface. • Serves not only as an image editor but also an image library and backup solution (more on that later).	• You have to buy a newer Windows 8.1/10 PC to use it. • Does not many editing features as competitors products. • Only available for Windows 8.1 and later.

Best for: The PC-lover

Popular Image Editing Programs: Windows-only options

Microsoft Paint: Windows only (Comes with most versions)



Popular Image Editing Programs: Windows-only options

MS Paint: Windows only (Comes with most versions)

Pros/ Strengths	Cons/Limitations
• Easy to use interface. • Widely available	• Not many editing features. • Very basic program. • Not good for editing multiple images.

Best for: If you are desperate…

Preserving your physical images

Film: including slides and positive or negative camera film

Special Considerations:

- If possible use white cotton gloves to avoid fingerprint on the film.
- Store the film in as cool as a place as possible. Also make sure it is labeled and in a dry container.

Equipment needed:

- Flatbed scanner capable of film scanning: Epson Perfection V600 Color Flatbed Scanner
- Dedicated Slide Scanner: Wolverine F2D 20MP Slide Scanner

Film: printed images from film or digital camera.

Special Considerations:

- If prints are in poor condition or fragile consider scanning them at a higher resolution so they will never have to scanned again.
- Store prints in plastic photo albums individually in a cool, dry location.

Equipment needed:

- Modern color flatbed scanner : Epson Perfection V600

- No scanner or time? You can outsource to the work to a company for 10-30cents a print such as: fotobridge.com

Printed documents or texts.

Special Considerations:

- If you are digitizing the materials not just for their content but also for their illustrations, marginalia or other attributes consider scanning at photo quality.
- If you digitizing the materials solely to preserve the text/information consider saving as pdf/a and using OCR (optical character recognition software) in a program like Adobe Acrobat.

Equipment needed:

- If materials are not bound then a flatbed or document scanner would be best.
- If bound material then uses a digital camera or smartphone maybe the best option unless you have access to a book scanner.

CamScanner + App

Preserving your online digital images

Google Drive

iCloud

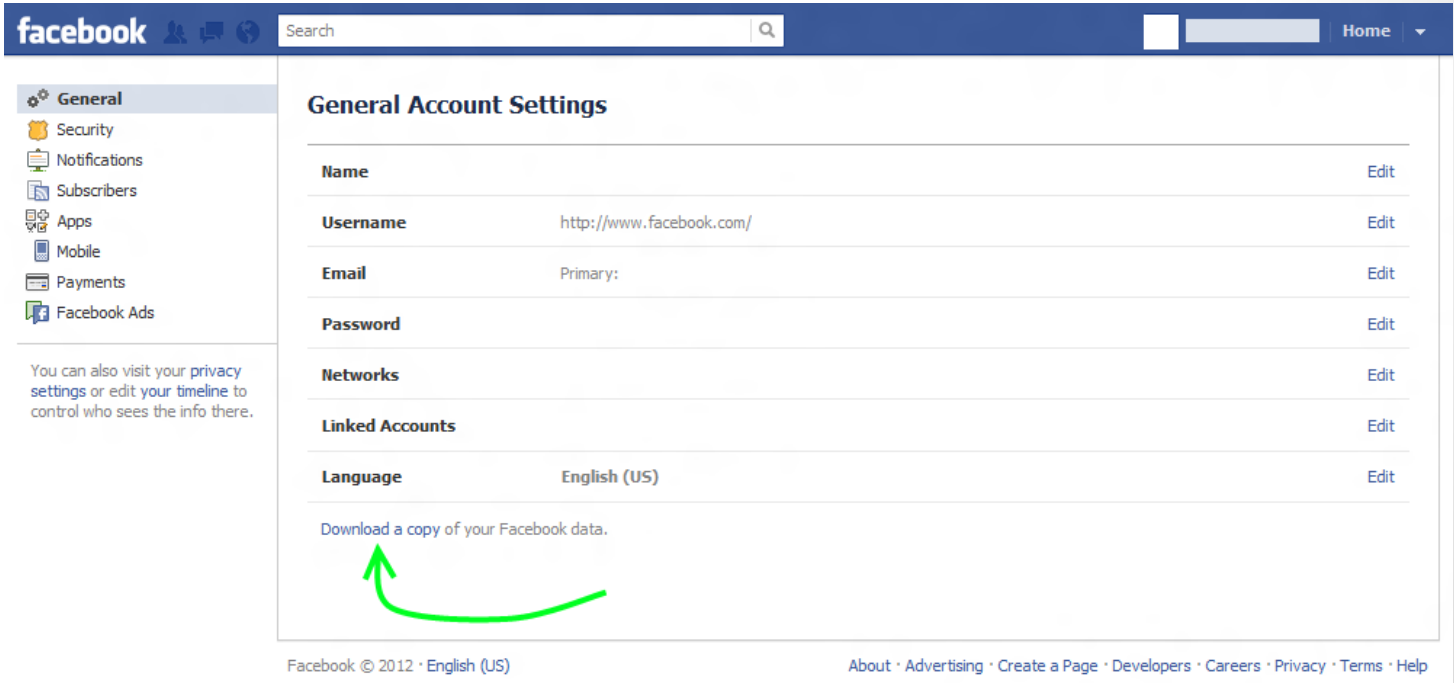
Connecting people with information through libraries

NJ State Library
An affiliate of Thomas Edison State College

Facebook Photos

Not sure where or if you have all the original images you uploaded to Facebook? Don't worry!

- Facebook allows you to download an archive of all your content including your photos.
  - 1. Go to the general section your account settings in Facebook and click: "Download a copy of your Facebook data" then click "Start my Archive". You will be emailed by Facebook when your data is ready to download.

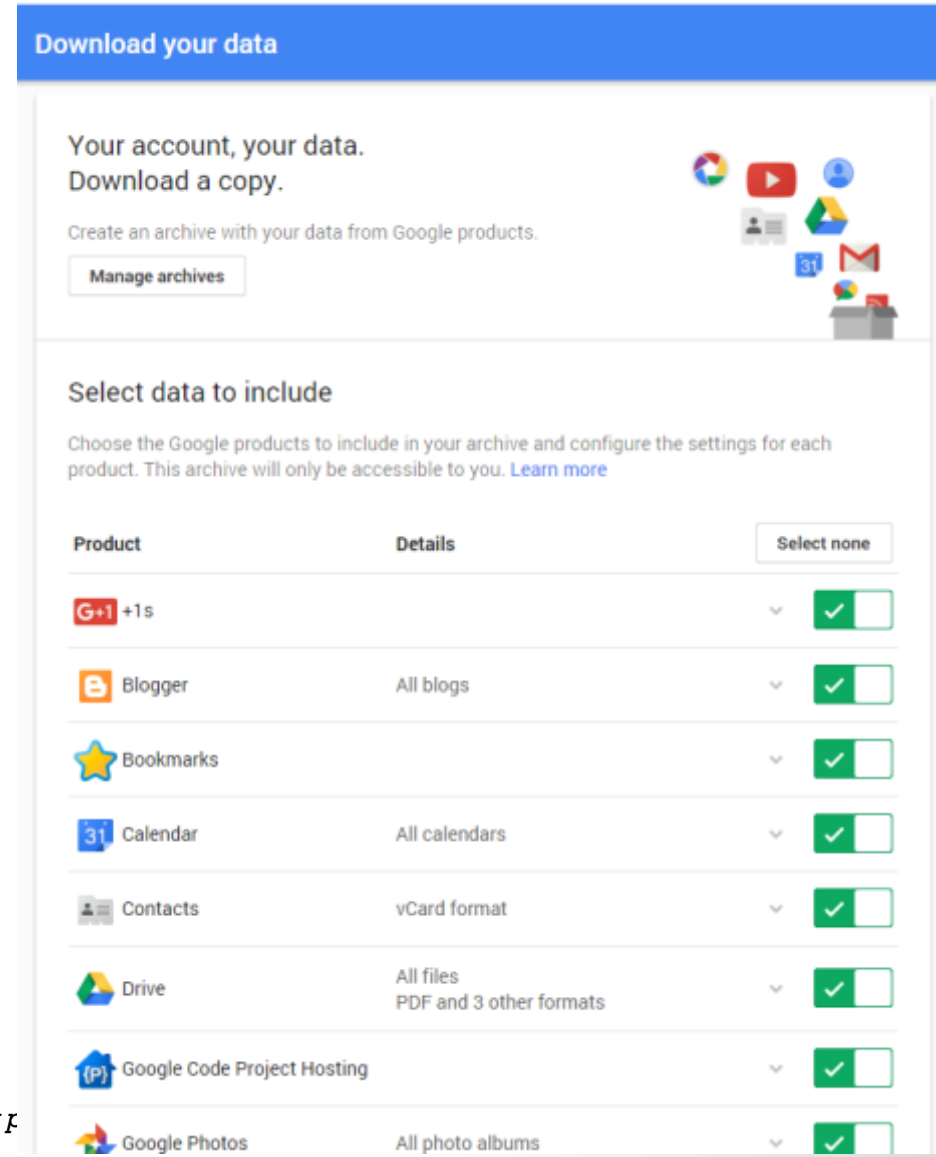


Google Drive/Gmail Photos

Have lots of images stored on Google Photos in Google Drive that you would like to download? Google has a tool to do this:

- Google thankfully has one of the more robust personal archiving tools for most of there products including, Google Drive, Gmail and more.

1. Go to: google.com/takeout
2. Select what to save.
3. Create the archive



iCloud Photos

Have lots of images stored on iCloud that you would like to download? Follow these instructions from Apple:

- If you enabled iCloud Photo Library, your photos and videos are automatically uploaded to iCloud at full resolution. To make copies of these photos and videos:
  - In iOS 8 or later, tap Settings > iCloud > Photos. Then select Download and Keep Originals and import the photos to your computer.
  - In OS X Yosemite v10.10.3 or later, open the Photos app. Choose Photos > Preferences, then select Download Originals to this Mac.
  - Open iCloud for Windows.

  Click the Options button next to Photos (or Photo Stream). Note the path listed under iCloud Photos location.

  Open a File Explorer window (Windows 8) or Windows Explorer window (Windows 7).

  Go to the iCloud Photos folder using the above path. Open the Shared folder.

  Select the photos you want to save, then copy them to another folder on your computer. Include this folder if you back up your computer.

Instagram Photos

Not sure where or if you have all the original images you uploaded to Instagram? Don't worry!

- Instagram does not have a built in downloadable archive feature like Facebook yet, but there are third-party sites which will perform the same function. They include:
  - 1. instaport.me
  - 2. http://downgram.com/

  - Disclaimer: I have not used these services myself so be wary of reading the small print before using them. They may require signing a user agreement which might contain agreements which violate your privacy.

Have photos stored in some other online spot…

Such as:

- Myspace
- Photobucket
- Flickr
- Twitter

There may be a tool that can help…

- There are many Google Chrome Browser plug ins which can help.
- You can always your local public librarian for help.
- Or check sites such as: archiveteam.org

OK , how do I preserve all these files?

1. Get them all in one place.

- Take of your digital files and organize them on one directory on your computer.
- If possible add in a date and keyword right into the file name of your photos. Such as: 2015.10.15_Ben_Birthday.tif

Free batch file-renaming programs are available to help achieve this. Previously discussed image editing software can help with this step as well such as the photo apps available for Windows and Mac computers. Picasa is another free option.

- If you can, try and organize the photos by year in folders. You can be more specific if you would like by then organizing the photos in specific albums or themes.

2. Weed your photos.

- Take a good look at your photos and decide which to keep or delete.
- Storage space if not free so be careful about how many copies you keep.
- A good tip can be to get rid of duplicates or images that have no emotional, historic, or informational value to you.

3. Copy and back up your photos.

- Best practice for preserving files:
  - The more copies, the better. How many?
    - Hard to say, but I would recommend at least 2-3 local physical copies and 1-3 cloud-based backups. For example:
      - My image collection:
        - One copy on my laptop
        - One copy on my external hard drive
        - One copy on the external hard at my relatives house
        - One copy stored on Amazon Glacier
        - One copy stored on Google Nearline
        - One Copy on Google Drive

3.1 Copy and back up your photos: Storage options

Physical Storage	Cloud Storage
Good: External or internal disk drives: lot's of space, cost effective. NAS's (Network Attached Storage) devices which connect to your home network and allow for wireless data backup are also good options.	"Home user" options: Google Drive, Apple iCloud, Dropbox, Amazon Cloud, Microsoft OneDrive, Box, Copy, Hightail
OK: Thumb drives: Space can be an issue. Easier to lose.	"Archival user" options: Amazon Glacier, Google Nearline
Bad: DVDs or CDs: Can scratch easily and they have a limited lifespan.	

A few of the Cloud Options Explained:

- "Home User" options (What I mean by this is those that want easier to use options with less setup. These options also frequently connect directly to your smart devices as well) :
  - **Google Drive/ Photos**: included with a Gmail account. Currently offers unlimited cloud photo storage if you allow Google to limit their quality to pictures less than 16,000 pixels or about 4608 x 3456 pixels. Google also automatically scans your photos using facial recognition software and can even identify animals in your picture. This very convenient for searching through images, but some may find it creepy and intrusive. Google also offers free applications to automatically have images taken with your smartphone uploaded.
  - **Apple iCloud**: Similar to Google Photos except it gear3ed towards Apple products and only allows the first 5Gb of storage for free.
  - **Dropbox**: Similar to Google Drive but allows for all types of files to be stored and only allows the first 2GB of storage for free.
  - **Microsoft OneDrive**: Very similar to Google Drive. It works automatically with Microsoft Office and Microsoft Photos App. Offers 15GB free storage to start.

A few of the Cloud Options Explained:

- "Archival User" options (What I mean by this is these two options require additional software and work to setup, but offer the lowest prices in storage costs in return) These two options are referred to as "Cold" cloud storage. This means that files stored on these services are not meant to be accessed frequently after being uploaded. They also can not be downloaded as quickly as filed on cloud storage service listed in the last slide. The current two options are….

Archival or Cold Cloud Storage Continued…

- **Amazon Glacier: From Amazon:** "Amazon Glacier is a secure, durable, and extremely low-cost storage service for data archiving and long-term backup. Customers can reliably store large or small amounts of data for as little as $0.007 per gigabyte per month, a significant savings compared to on-premises solutions. To keep costs low, Amazon Glacier is optimized for infrequently accessed data where a retrieval time of several hours is suitable."
- **It is best used with a third-party cloud ftp client software to setup scheduled backups.**

Archival or Cold Cloud Storage Continued…

- Google Nearline: From Google: "Google Cloud Storage Nearline is a low-cost, highly-durable storage service for data archiving, online backup, and disaster recovery. Data is available in seconds, not hours or days. With ~3 second response times and 1 cent per GB/month pricing, Cloud Storage Nearline gives you the best performance at the lowest cost."

- Like Amazon Glacier it can also be used cloud ftp client software to setup scheduled backups.

3.2 Copy and back up your photos.

- Create a schedule for downloading, organizing, naming and backing up new photos.
- Test your backups to make sure they are working and accurate.
- Plan to migrate your to new devices, storage location and possibly even file format every 5 years!

Scanning Options Available to you at the New Jersey State Library include:

The ScanPro3000 microfilm scanner. Great for color and black and white scanning of positive and negative film, (although it is designed primarily for microfilm.)

Easy to use touchscreen flatbed scanner designed for color scanning of documents, images and bound books.

Thanks for listening!

Feel free to contact me with questions:

Benjamin Saracco
Digital Projects & NJ Reference Library
New Jersey State Library
(609)2782640 ext: 115
bsaracco@njstatelib.org